

Notice of Allowability

Application No.

10/071,127

Applicant(s)

IL-YONG ET AL.

Examiner

Toniae M. Thomas

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the papers filed on 08 February 2002.
2. ☒ The allowed claim(s) is/are 1-9.
3. ☒ The drawings filed on 08 February 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 04/29/02
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Reasons for Allowance

The following is an examiner's statement of reasons for allowance: the prior art of record does not anticipate or render obvious a method for fabricating a power semiconductor device substantially as claimed. Claim 1 recites:

A method for fabricating a power semiconductor device comprising: sequentially forming an epitaxial layer of a first conductivity type having a low concentration and a body region of a second conductivity type on a semiconductor substrate of the first conductivity type having a high concentration; forming an oxide layer pattern on the body region; forming a first trench using the oxide layer pattern as an etching mask to perforate a predetermined portion of the body region having a first thickness; forming a body contact region of the second conductivity type having a high concentration to surround the first trench by impurity ion implantation using the oxide layer pattern as an ion implantation mask; forming first spacer layers to cover the sidewalls of the first trench and the sidewalls of the oxide layer pattern; forming a second trench using the oxide layer pattern and the first spacer layers as etching masks to perforate a predetermined portion of the body region having a second thickness greater than the first thickness forming a source region of the first conductivity type having a high concentration to surround the second trench by impurity ion implantation using the oxide layer pattern and the first spacer layers as ion implantation masks; forming second spacer layers to cover the sidewalls of the second trench and the sidewalls of the first spacer layers; forming a third trench to a predetermined depth of the epitaxial layer using the oxide layer pattern, the first spacer layers, and the second spacer layers as etching masks; forming a gate insulating layer in the third trench; forming a gate conductive pattern in the gate insulating layer; forming an oxide layer on the gate conductive layer pattern; removing the first and second spacer layers; forming a first metal electrode layer to be electrically connected to the source region and the body contact region; forming a second metal electrode layer to be electrically connected to the gate conductive layer pattern; and forming a third metal electrode layer to be electrically connected to the semiconductor substrate.

The prior art of record fails to anticipate, teach or suggest - either separately or combined - a method for fabricating a power semiconductor device, wherein the method comprises the combination of steps substantially as claimed in claim 1.

There are no outstanding issues. Accordingly, the current application is in condition for allowance.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday-Thursday from 8:30 a.m. to 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMJ

29 September 2004


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800